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# PATENT SPECIFICATION

1,087,549

NO DRAWINGS.

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## COMPLETE SPECIFICATION. U. S. PATENT OFFICE

### Process of Calcining Gypsum.

We, B.P.B. INDUSTRIES LIMITED, formerly known as The British Plaster Board (Holdings) Limited, a British Company, of Ferguson House, 15/17 Marylebone Road, London, N.W.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement: —

The present invention relates to the process of calcining powdered gypsum which is the subject of copending Application No. 39186/62 (Serial No. 1,018,464) and represents an improvement in or modification of the process of that application.

Co-pending Application No. 39186/62 (Serial No. 1,018,464) describes and claims a process of calcining gypsum in which powdered gypsum is heated in a calcination vessel to calcine the gypsum and further powdered gypsum is added continuously at the upper end of the vessel to cause the calcined material to be discharged in a substantially fluidised condition by pressure of the head of material in the vessel through a rising conduit in communication with the lower end of the vessel.

In the example of a process according to the abovementioned Application specifically described with reference to Fig. 1 of the drawings in the specification of that Application, it is described how the vessel may be initially filled with raw gypsum which is first calcined in the normal way, and once the material has been calcined further raw gypsum is fed onto the top of the mass to cause discharge of the calcined material.

It will be appreciated that when the process is started in this way, the calcination of the initial filling of the vessel is indistinguish-

able from conventional batch calcination, whereas subsequent calcination with the continuous addition of fresh gypsum takes place under conditions different from those of conventional batch working. These differences in conditions between starting and normal running are reflected in the properties of the plaster produced, and, particularly when certain types of gypsum rock are employed as raw materials, may affect the manner in which the product is utilised. For convenience, the plaster produced under batch conditions will be termed "batch plaster" and that produced under normal running conditions will be termed "continuous plaster".

It has been found that when the calcination process is started up as described above, the material first discharged is of the "batch" type, and batch plaster may continue to be discharged for periods of as much as 1½ to 2 hours. It is only after prolonged running that a true "continuous" plaster is discharged and, where the two types differ considerably in properties, this may be most undesirable.

It has now been found that if the process is started with only enough raw gypsum to cover the bottom of the vessel, preferably an amount sufficient to seal off the open lower end of the rising discharge conduit, and this small quantity is heated until the operating temperature for continuous calcination is attained, whereupon the continuous addition of further raw gypsum is begun initially to fill the vessel and subsequently to cause the discharge of calcined material therefrom, the temperature during filling being maintained at the said operating temperature, the calcined material first discharged is of the "continuous" type, and no substantial variation in properties of the

material discharged occurs during the course of continuous running.

In one example of a procedure according to the present invention, powdered gypsum is introduced into a calcining kettle fitted with a discharge standpipe, as shown in the Fig. 1 of the drawing of the said pending Application, and at the same time the burner is started. When there is a depth of from 18 to 24 inches of mineral in the base of the kettle, the gypsum feed is stopped and heating is continued until the charge approaches a desired operating temperature of say 320°F. As soon as this temperature is reached, the feed of raw gypsum is recommenced and the temperature maintained at 320°F by adjusting the rate of feed of gypsum.

When the level of material in the kettle reaches the level of the weir in the discharge conduit, calcined material begins to be discharged and is found to be substantially of "continuous" type.

At the operating temperature, the mass of material in the vessel is kept in a substantially fluidised condition by the evolution of water vapour by the gypsum undergoing calcination. As explained in the pending Application the discharge of the calcined material is greatly facilitated if the evolution of further water vapour is brought about in the discharge conduit by local heating or the introduction of air, whereby the temperature of the calcined material is caused to exceed the equilibrium temperature for conversion of hemihydrate to soluble anhydrite at the partial pressure of water vapour prevailing in the discharge conduit.

#### WHAT WE CLAIM IS:—

1. A process of calcining gypsum in

which only sufficient powdered gypsum to cover the bottom of a calcination vessel is heated to calcine the gypsum whereupon further powdered gypsum is added continuously at the upper end of the vessel to fill the vessel and thereafter to cause calcined material to be discharged by pressure of the head of material in the vessel through a rising conduit in communication with the lower end of the vessel, the temperature in the vessel being maintained substantially constant throughout the continuous addition of powdered gypsum.

2. A process according to Claim 1 in which the initial quantity of gypsum is heated to the temperature at which continuous calcination is to be carried out and the rate of addition of further gypsum is adjusted to maintain the said temperature.

3. A process according to Claim 2 in which the vessel is heated while the initial quantity of gypsum is being introduced and heating is continued after the bottom of the vessel has been covered and the introduction of gypsum has ceased until the said temperature has been reached whereafter the continuous introduction of further raw gypsum is begun.

4. A process according to any of Claims 1 to 3 in which the initial quantity of gypsum is sufficient to seal off the open lower end of the rising conduit within the vessel.

5. A process of calcining gypsum substantially as described with reference to the example herein.

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